Behavior-dependent senescence in pelagic copepods

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BEHAVIOR-DEPENDENT SENESCENCE IN PELAGIC COPEPODS

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Copepods have diverse behaviors that expose different species very differently to predation risk. In predator-free laboratory environments, we found that the average adult longevity of small copepods varied 10-fold between species and sexes, and this variation was significantly related to the extent of risk-taking behavior. For example, ambush-feeding copepods have a low risk of encountering a predator compared to copepods that cruise rapidly in search for food, and the former live very much longer than the latter, even in the absence of predators, and also have much lower egg production rates. These results are consistent with the idea that species adapted to low external mortality invest in maintenance, and hence, have a long life, while high external mortality may rather lead to high investment in reproduction.

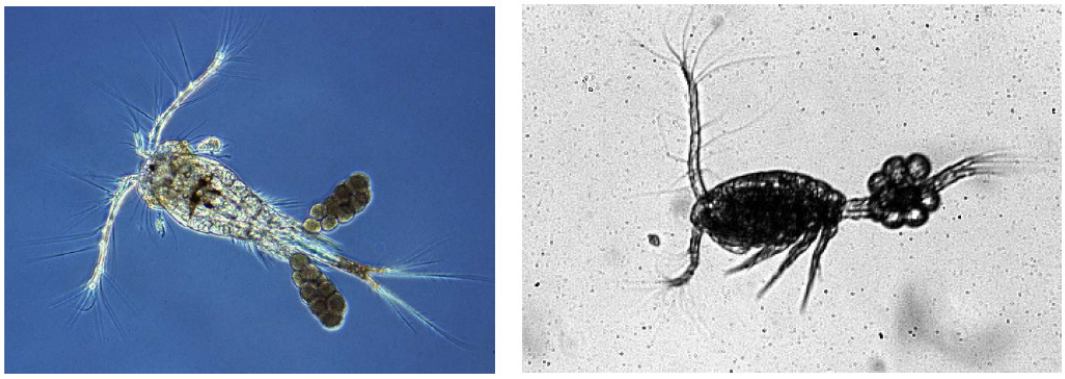

Photo 1. *Oithona davisae* (0.3 mm) is an egg-carring ambush-feeding copepod; the right panel show the initiation of an attack on a dinoflagellate. The females have an average adult life span of 4 months in a protected lab environment, the longest recorded among the species examined. Photos by A. Calbet (left panel) and T. Kiørboe (right panel).

Photo 2. *Centropages typicus* (1 mm) is a cruising copepod with a high-risk feeding behavior. The males swim a little fast to find females, and hence have a somewhat higher risk of encountering a predator. The average adult longevity is 3 weeks for the female and 2 weeks for the male. Photo by E. Selander.

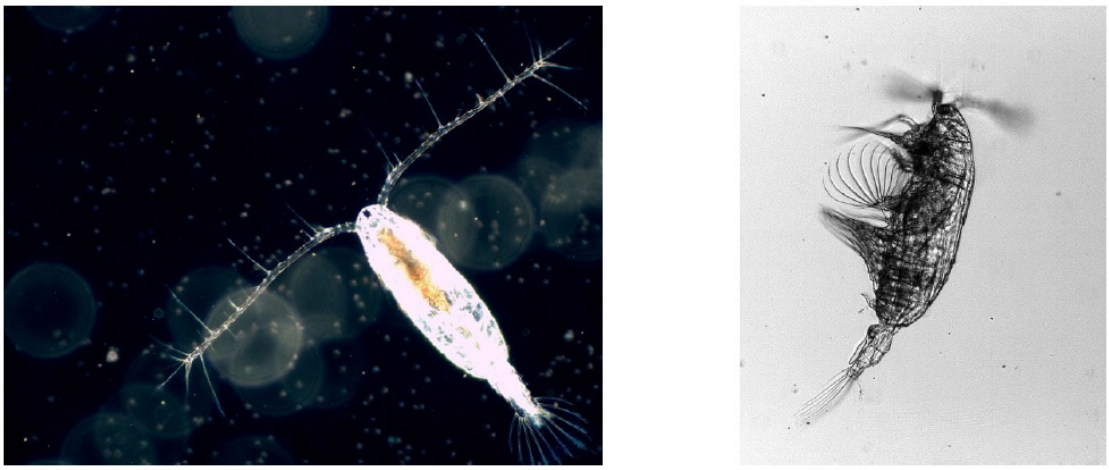

Photo 3. *Acartia tonsa* (0.8 mm) generates a feeding current; the right panel shows the opening of the feeding appendages that generates the feeding current. Mate finding in this species is symmetrical between the genders, and males and females have very similar average adult longevity in a protected laboratory environment. Photos by T. Kiørboe (left panel) and J. Xu (right panel).

These photographs illustrate the article "Interrelations between senescence, life history traits, and behavior in planktonic copepods," by Thomas Kiørboe, Sara Ceballos, and Uffe H. Thygesen, published in *Ecology* 96(5):2225–2235. http://dx.doi.org/10.1890/14-2205.1